

**Presidential Advisory Committee**  
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**Rural Connectivity - Optical Cable Systems**

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## **Christopher Stefano**

- Manager, Global Engineering Services, MCI Telecommunications Inc..
  - Global Network Platforms and Infrastructure.
  - Satellite Ground Stations and Overseas Microwave facilities.
- 14 years experience in Network Design, Network Planning and Network Operations.

## Order of Magnitude Cost

- **Fiber Cable Cost (per Mile):**

<b>Fiber Type</b>	<b>12 Fiber</b>	<b>24-Fiber</b>	<b>48-Fiber</b>
LS Fiber Cable	\$4000	\$7500	\$15000
SM Fiber Cable	\$3000	\$5000	\$11000
Fog-Wire (LS)	\$12500	\$16000	\$33000

## **Cost Drivers**

- **Fiber Optic Cable**
- **Outside Plant Construction :**
  - Labor, Equipment, Materials
- **Outside Plant Materials :**
  - Carrier Specific markings and warning/caution signs.
- **Engineering Resources :**
  - Design and Implementation of Outside Plant, Transmission Systems, Power/HVAC.
- **Electronics/Auxiliary Equipment:**
  - LTE, Multiplexors, Optical Amplifiers, Synchronization, Regeneration, Power, HVAC, etc..
- **Building/Shelter Construction**

## **Cost Drivers Continued**

- **Right of Way Management :**
  - Research/Negotiate ROW access.
- **Right of Way Cost:**
  - One Time and Re-Recurring expenses.
- **Non-Recurring Right of Way Cost :**
  - Permits, Legal Notices.
- **Recordation :**
  - Filing documentation for State and Local agencies.
- **Technical Facilities :**
  - Facility infrastructure.
- **Carrier's Profit Margin**
- **Taxes and Freight**

## Order of Magnitude Cost

- **Regeneration Sites** : \$200,000 each
- **Light Equipment Per Fiber Pair** :

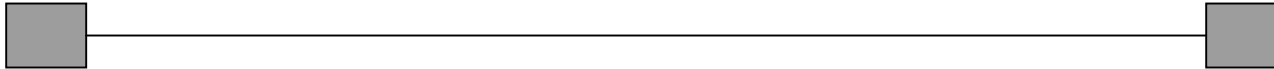
<u>OC-48 @1550nm</u>		
LTE 1:1	1:N, N=1	\$250,000
LTE 1:N	Add'l Chan	\$120,000

- **Outside Plant Construction** :

MILEAGE	RAIL /ROAD BUILD		METRO BUILD	
	Arial	Buried	Arial	Buried
<b>1</b>	\$ 120,000	\$130,000 - \$160,000	\$ 135,000	\$160,000 - \$400,000
<b>&gt; 30</b>	\$ 35,000	\$40,000 - \$60,000	\$ 45,000	\$75,000 - \$300,000

## Example Costs

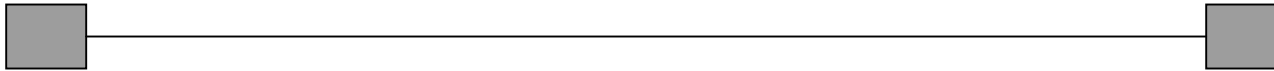
- **Example #1: Backbone Connection Rural-Rural**



- 276 Miles Buried.
  - 48 Dispersion Shifted Fibers.
  - 3:1 OC-48 Electronics.
  - 32 Optical Amplifiers.
  - 2 Regeneration sites.
  - 1 Drop and Re-insert site.
  - New Diverse Building Entrance
- **Total Cost: \$30,000,000 (~ \$110,000 per Mile)**

## Example Costs

- **Example #2: Backbone Connection Metro-Metro (Rural Transits)**

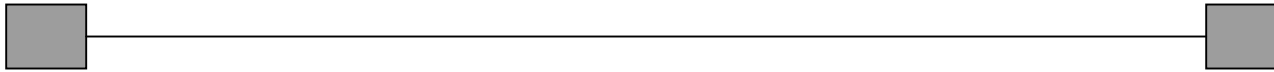


- 735 Miles Buried.
    - 32 miles existing plant
    - 68 miles public right of way
    - 635 miles rail build
  - 48 Dispersion Shifted Fibers.
  - 4:1 OC-48 Electronics.
  - 90 Optical Amplifiers.
  - 4 Regeneration sites.
  - 4 Drop and Re-insert sites.
  - New Diverse Building Entrance
- **Total Cost: \$85,000,000 (~ \$115,000 per mile)**



## Hypothetical/Rough Order Magnitude Costs

- Seattle Washington - Fairbanks Alaska



- 2175 Miles Buried.
  - 24 Dispersion Shifted Fibers.
  - 1:1 OC-48 Electronics.
  - 37 Regeneration sites.
- Total Cost: \$140,000,000 (~ \$65,000 per mile)
    - Excluding:
      - Right of way costs
      - Carrier Profit Margin
      - Engineering Resources